

IN THE CLAIMS

Please amend the claims as follows:

- 1 1. (Withdrawn) A method of p-type doping in ZnO comprising:
2 forming an acceptor-doped material having ZnO under reducing conditions,
3 thereby insuring a high donor density; and
4 annealing the specimens of said acceptor-doped material at intermediate
5 temperatures under oxidizing conditions so as to remove intrinsic donors and activate
6 impurity acceptors.
- 1 2. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a
2 hydrogen containing atmosphere.
- 1 3. (Withdrawn) The method of claim 1, wherein said reducing conditions comprise a
2 non- hydrogen containing atmosphere.
- 1 4. (Withdrawn) The method of claim 1, wherein said acceptor-doped material comprises
2 a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited
3 on said n-type ZnO layer.
- 1 5. (Withdrawn) The method of claim 1, wherein said intermediate temperatures
2 comprise a temperature range between 200 °C and 700 °C.
- 1 6. (Withdrawn) A method of forming p-n junctions using p-type ZnO comprising:
2 forming an acceptor-doped material having ZnO under reducing conditions,
3 thereby insuring a high donor density; and

4 annealing the specimens of said acceptor-doped material at intermediate
5 temperatures under oxidizing conditions so as to remove intrinsic donors and activate
6 impurity acceptors.

1 7. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a
2 hydrogen containing atmosphere.

1 8. (Withdrawn) The method of claim 6, wherein said reducing conditions comprise a
2 non- hydrogen containing atmosphere.

1 9. (Withdrawn) The method of claim 6, wherein said acceptor-doped material comprises
2 a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer deposited
3 on said n-type ZnO layer.

1 10. (Withdrawn) The method of claim 6, wherein said intermediate temperatures
2 comprises a temperature range between 200 °C and 700 °C.

1 11. (Currently Amended) A wide band gap semiconductor device comprising:
2 -a substrate;
3 a n-type ZnO layer formed on said substrate; and
4 a p-type ZnO layer formed on said n-type ZnO layer;
5 wherein said n-type ZnO layer and said p-type ZnO layer are annealed in air to
6 activate p-type conductivity

7 ~~an acceptor-doped material having ZnO that is formed under reducing conditions, thereby~~
8 ~~insuring a high donor density; wherein the specimens of said acceptor-doped material are~~

9 ~~annealed at intermediate temperatures under oxidizing conditions so as to remove~~
10 ~~intrinsic donors and activate impurity acceptors.~~

1 12. (Currently Amended) The wide band gap semiconductor device of claim 11,
2 wherein said p-type ZnO layer is produced said in reducing conditions ~~comprise~~
3 comprising a hydrogen containing atmosphere.

1 13. (Original) The wide band gap semiconductor device of claim 11, wherein said p-
2 type ZnO layer is produced said in reducing conditions ~~comprise comprising~~ a non-
3 hydrogen containing atmosphere.

1 14. Canceled.

1 15. (Currently Amended) The wide band gap semiconductor device of claim 11,
2 wherein said n-type ZnO layer and said p-type ZnO layer are annealed intermediate
3 ~~temperatures comprise a temperature range between 200 °C and 700 °C.~~

1 16. (Currently Amended) A p-n junction comprising:
2 a substrate;
3 a n-type ZnO layer formed on said substrate; and
4 a p-type ZnO layer formed on said n-type ZnO layer;
5 wherein said n-type ZnO layer and said p-type ZnO layer are annealed in air to
6 activate p-type conductivity ~~an acceptor doped material having ZnO that is formed under~~
7 ~~reducing conditions, thereby insuring a high donor density; wherein the specimens of said~~
8 ~~acceptor doped material are annealed at intermediate temperatures under oxidizing~~
9 ~~conditions so as to remove intrinsic donors and activate impurity acceptors.~~

1 17. (Currently Amended) The p-n junction of claim 16, said p-type ZnO layer is
2 produced in reducing conditions comprising a hydrogen containing atmosphere wherein
3 ~~said reducing conditions comprise a hydrogen containing atmosphere.~~

1 18. (Currently Amended) The p-n junction of claim 16, wherein said p-type ZnO layer is
2 produced in reducing conditions comprising a non- hydrogen containing atmosphere
3 ~~wherein said reducing conditions comprise a non- hydrogen containing atmosphere.~~

1 19. (Original) The p-n junction of claim 16, wherein said acceptor-doped material
2 comprises a substrate, a n-type ZnO layer deposited on said substrate, and a p-type layer
3 deposited on said n-type ZnO layer.

1 20. (Currently Amended) The p-n junction of claim 16, said n-type ZnO layer and said p-
2 type ZnO layer are annealed between 200 °C and 700 °C wherein said intermediate
3 ~~temperatures comprises a temperature range between 200°C and 700°C.~~